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सुरक्षा रीति संहिता

(पहला पुनरीक्षण)

**Code of Safety Practice for Domestic
LPG Installation**

(*First Revision*)

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FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards on recommendation of the Domestic and Commercial Gas Burning Appliances (Pressure Type) Sectional Committee, and approved by the Mechanical Engineering Divisional Council.

The Liquefied Petroleum Gases (LPG) are hydrocarbons in a gaseous state at normal atmospheric pressure, and under moderate pressure at normal temperature. LPG is stored, filled, and transported as a liquid in portable cylinders, but used as gas. Thus the large volume of gas approximately 246 volumes of gas is compressed into one volume of liquid LPG and stored under pressure in cylinders.

LPG produced and marketed in India conforms to IS 4576 and designated as Commercial Butane/Propane Mixture. LPG is colourless, odourless, and is highly inflammable, a malodourant (foul smell) is added to detect gas leakage. The gas is twice as heavy as air and can form an explosive mixture with air even in very small concentrations. It boils at temperatures below the freezing point of water, thus at normal temperatures are exerting internal pressure, which is several times that of atmospheric pressure. Although cylinders are designed and tested for the requisite internal pressure, at excessive temperatures the gas in the cylinder can attain high internal pressures which can result in failure of the cylinder to stand such pressures. LP Gases in liquid form have a tendency for a very large expansion in volume. It expands almost 10 times as much as water and 100 times that of steel. Thus, liquid LPG is never filled in a cylinder up to the brim but an ullage or space for gas is left above the liquid.

In view of the above and other safety-related properties, some simple rules/code need to be observed for its safe operation/installation. Because the rules are simple, they are neglected. Failure to observe these rules may lead to accidents of varying intensity. This code assumes particular relevance to Indian conditions where the use of LPG in the individual household has been widely expanding and protection of consumers from the hazards arising during installation and operation is of vital interest.

While preparing this standard, it is presumed that only standardized and approved equipment and appliances are used in the LPG installation. The distribution equipment that is a cylinder, valve, and pressure regulator, is the property of oil companies loaned to the consumer against a refundable deposit. The maintenance of the same is the responsibility of oil companies. Customers are not to tamper with the equipment.

The composition of the Committee responsible for the formulation of this standard is given at Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be same as that of the specified value in this standard.

Indian Standard

CODE OF SAFETY PRACTICE FOR DOMESTIC LPG INSTALLATION

(First Revision)

1 SCOPE

This standard covers general safety requirements to be observed during the installation and operation of domestic appliances using LPG in cylinders as fuel.

2 REFERENCES

The following standards contain provisions, which through reference in this text constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>	<i>IS No.</i>	<i>Title</i>
3196 (Part 1) : 2013	Welded low carbon steel cylinders exceeding 5 litres water capacity for low pressure liquefiable gases: Part 1 Cylinders for liquefied petroleum gases (LPG) — Specification (<i>sixth revision</i>)	11480 : 1985	Specification for domestic grillers for use with liquefied petroleum gases
8737 : 2017	Valve fittings for use with liquefied petroleum gas (LPG) cylinders for more than 5 litre water capacity — Specification (<i>second revision</i>)	4576 : 2021	Liquefied petroleum gases — Specification (<i>third revision</i>)
9798 : 2013	Low pressure regulators for use with liquefied petroleum gas (LPG) — Specification (<i>second revision</i>)		
9573 (Part 2) : 2017	Rubber hose for liquefied petroleum gas (LPG) — Specification: Part 2 Domestic and commercial application (<i>fourth revision</i>)		
4246 : 2002	Domestic gas stoves for use with liquefied petroleum gases — Specification (<i>fifth revision</i>)		
4760 : 2002	Domestic cooking ranges including grillers for use with liquefied petroleum gases — Specification (<i>third revision</i>)		

3 GENERAL

3.1 The term domestic shall mean individual household and installation shall mean to consist of the following:

- a) A cylinder conforming to IS 3196 (Part 1) fitted with a spring-actuated self-closing valve conforming to IS 8737 and approved by the Chief Controller of Explosives for India;
- b) A pressure regulator of appropriate type matching the cylinder valve and conforming to IS 9798;
- c) LPG resistant flexible tubing conforming to IS 9573 (Part 2); and
- d) An appliance, such as LPG stove conforming to IS 4246 and/or cooking range conforming to IS 4760 and/or grillers conforming to IS 11480 or any other approved appliance for domestic use conforming to relevant IS code.

4 INSTALLATION

4.1 Place of Installation

4.1.1 The kitchen or room where the appliance is installed shall be well ventilated so that leakage of gas, if any, during faulty/delayed ignition of the burners or extinguishing of flame or due to any other leakage is swept away by natural draft.

4.1.2 The kitchen or room shall have at least one window and one door open to the atmosphere.

4.1.3 The kitchen door shall have a minimum gap of 3 mm under the door shutter at floor level.

4.1.4 The door opening of the kitchen shall not be near lift shaft or entry/exit to the basement.

4.2 Installation of Appliance

4.2.1 The appliance shall preferably be installed on the platform approximately 75 cm high from the floor level, facing the wall.

4.2.2 The appliance shall not be installed next to the entry/exit door and shall be installed in such a place in the room that in case of a fire the entry and exit for the occupants inside the room is not blocked.

4.2.3 Any leakage shall not be checked with naked fire or lighted match stick.

4.2.4 Appliance with open frames shall not be placed directly in front of a window facing a strong breeze, disturbing /blowing off or extinguishing the flame.

4.2.5 Cabinets, shelves or such other mountings on the wall behind the appliance shall be totally avoided (lest loose clothing, such as sarees may come in contact with flames while removing the contents from wall mountings).

4.2.6 Ensure that the inlet nozzle to the appliance is on the same side at which the cylinder is kept.

4.3 Installation of Cylinder

4.3.1 The gas cylinder shall always be installed in an upright/vertical position and at floor level. Under no circumstances, it shall be placed horizontally. If the cylinder is installed in a position other than vertical, in the event of a leak, liquid LPG will leak which is more hazardous than leakage of gas.

4.3.2 Do not use stand for the cylinder. Cylinders shall always be kept on their 'foot ring' welded at the bottom of cylinders. If the cylinder is placed on a trolley, the trolley should have a locking arrangement to prevent movement of the cylinder while connected.

4.3.3 The installed cylinder shall be easily accessible and shall not be placed in a closed enclosure. The location shall be such that leaked gas, if any, be swept away by natural draft.

4.3.4 The cylinder shall be so installed that the gas tubing shall not get disturbed due to the movement of the operator during use.

4.3.5 Gas cylinder shall not be placed near any source of heat, such as kerosene stove, open fire chullas, heaters, boilers, or any potential sources of heat.

4.3.6 The LPG installation shall not be provided on a loft.

4.3.7 The LPG installation shall not be provided in a basement where the floor level is below the adjoining ground level. Only if effective artificial floor level ventilation is provided, the installation could be in such a basement.

4.3.8 Whenever an empty gas cylinder is replaced with a filled one (refill), ensure that the filled cylinder valve outlet carry a proper and undamaged rubber gasket. The absence of such a gasket will result in hazardous gas leakage.

4.3.9 After installing a new connection or replacing the empty gas cylinder the joint between the rubber tube and pressure regulator nozzle and that between rubber tube and appliance nozzle shall be checked with a soap solution for any leakage.

4.3.10 The leakage shall not be checked with naked fire or a lighted matchstick.

4.3.11 The colour of the cylinder shall not be changed. As per the international code, the 'Signal Red' colour identifies that the cylinder contains LP gas.

4.3.12 No flammable or combustible material shall be stored in the immediate vicinity of the cylinder/installation or in the same room in which it is kept.

4.3.13 No oil or similar lubricant shall be used on the valves or other fittings of the cylinder.

4.3.14 While receiving refills, due date for cylinder re-testing shall be checked. This is indicated at the back of one of the vertical stay plates below the valve protection ring. If the cylinder is due for testing, the cylinder shall not be accepted.

4.3.15 Cylinders shall not be installed under conditions that will cause them to corrode.

4.3.16 Cylinders are filled by weight. An overfilled cylinder is a potential safety hazard. While accepting refills, weight of the cylinder shall be checked with gas. If the gross weight of the cylinder is more than the sum of tare weight and net weight stenciled on the cylinder, such cylinder shall not be accepted.

5 GAS TUBING

5.1 The flexible tube used for the installation shall conform to IS 9573 (Part 2).

5.2 The tubing shall be regularly checked for its condition, especially the ends which can develop cracks while in service. It is necessary to replace tubing immediately if found to develop defects or as per the due date mentioned on the hose, whichever is earlier.

5.3 The end of the tubing shall be slipped onto the nozzle to cover the entire length of the nozzle.

5.4 The tubing end may be moistened with water while slipping the tubing onto the nozzle. Oil/grease/lubricant/soap solution shall not be used for slipping the tubing.

5.5 The tubing shall not have crimps or sharp kinks. It shall not unnecessarily be too long nor too short. The maximum recommended length of the tubing is 2 meters.

5.6 Tubing for domestic installation shall be standardized for size of the bore that is, 8 mm. The correct bore depending on the size of the nozzle on the appliance as well as on the pressure regulator shall be selected (*see also 5.2*).

6 APPLIANCE

6.1 Certification of the appliance by BIS shall be the guiding factor for its quality and safety-worthiness. In case of appliance manufactured to known international specifications, approval for use shall be verified in consultation with the oil company.

6.2 Prior to connecting the appliance, it shall be ensured that the inlet nozzle is of the same size (outer diameter) as that of the nozzle on the pressure regulator. This is essential so that rubber tubing fits tightly at both ends (*see also 4.6*).

6.3 The burners for LPG stoves and cooking range of burners are designed and approved to give greenish blue stable flames in full on and simmer position of gas taps. In case this is not obtained, the appliance needs to be checked/attended to by a trained mechanic of the LP gas distributor.

7 INSTRUCTIONS FOR USE

7.1 The consumer shall be guided by the operating instructions provided by the manufacturers of the appliance. In addition, the following safe practice shall also be ensured.

7.1.1 Before operating the pressure regulator knob to the ‘gas flow’ position, it is to be ensured that the appliance taps are in the ‘OFF’ position.

7.1.2 For lighting the appliance, a lighted match stick/flame type gas lighter shall be brought near to the burner ports (head). Then the gas cock of the appliance shall be opened to a full ‘ON’ position to avoid the escape of unburnt gas.

7.1.3 In case of delay/failure in lighting the burners, resulting in the escape of unburnt gas, close the appliance taps and wait till the mal-odour/foul smell indicating the presence of leaked gas disappear. Light the burners again following earlier instructions for lighting. This would avoid a situation of any minor fire or explosion.

7.1.4 The burner shall not be lighted in the ‘simmer’ position of appliance taps.

7.1.5 The burners shall not be lighted with vessels on them.

7.1.6 When the appliance is not in use, close the appliance taps and turn the regulator knob to the ‘gas off’ position before leaving the place.

8 CHANGING OF CYLINDER

8.1 The consumers shall ensure to follow the ‘Customer Instruction Card’ provided by oil companies through their LP gas distributor while releasing/installing a new connection.

8.2 While changing the cylinders, all the flames and all sources of fire in the kitchen like diya lamps, agarbattis, etc be put out. Avoid putting on jolt any electric appliance. Door/window be kept open.

9 RECEIPT OF FILLED CYLINDER AND RESERVE CYLINDER (UNCONNECTED)

9.1 On receipt of a filled cylinder, pre-delivery checks as outlined below shall be done by the LPG cylinder delivery personnel in the presence of the customer. Delivery personnel shall remove the seal and the ‘Safety Cap’ provided on the valve outlet during pre-delivery checks.

9.2 Delivery personnel shall check the cylinders for pin leak and O-ring leak using suitable instruments and demonstrates weight to the customer before delivery.

9.3 Delivery personnel connects the cylinder to the regulator and check for proper fitment.

9.4 Press in the ‘Safety Cap’ on the valve outlet. This is necessary to ensure that the gas will not leak out from an unconnected cylinder. This also prevents ingress of foreign matter in valve outlet which can render the valve leaky when in use. When the cylinder gets empty, the regulator has to be turned “off” and disconnected. Safety cap has to be placed back on the self-closing valve and stored safely.

10 TO HANDLE LEAKAGE

10.1 If gas is smelled, following procedure to be adopted to prevent fire hazards:

- a) Shut burner taps and pressure regulator knob, to the ‘OFF’ position;
- b) Open doors and windows for free ventilation;
- c) Extinguish all flames. Do not switch ‘ON’ or ‘OFF’ any electrical equipment to avoid any electric spark or other sources of fire/ignition;
- d) Light burners only after the smell disappear and the source of leakage has been identified and corrective action is taken;

- e) In case of persistent or heavy leakage, detach the pressure regulator from the cylinder valve, fit the ‘Safety Cap’ on the valve outlet and remove the cylinder (without tilting it) to a balcony or open space where it is least dangerous to life and property and away from any source of ignition. Keep away to avoid asphyxiation; and
- f) Call LP Gas distributor or emergency cell of oil companies for handling the emergency.

11 CLEANING THE APPLIANCE

11.1 The consumer shall be guided by the instructions as provided by the manufacturers with the appliance. If necessary, in addition, the following practice is recommended for cleaning of the appliance.

11.1.1 Close appliance taps and pressure regulator knob to the ‘OFF’ position and wait till the surface of the appliance is cooled. Cleaning of a hot surface, if attempted, with a wet cloth, the surface finish may crack.

11.1.2 First, the surface of the appliance shall be cleaned with a dry cloth. Then, the surface shall be cleaned with a moist cloth to remove stains from spilled cooking.

11.1.3 To clean the burner head remove and dip it in a solution of soap in warm water and clean the burner ports with ‘tooth prick’ or a soft metal (copper or aluminum) wire. Clean the burner head with plain water and wipe it dry to prevent rusting.

11.1.4 Neither tamper with the gas jet/orifice nor attempt to clean it with a steel pin.

11.1.5 Never dip the appliance body in water as the grease/lubricant in the gas tap may be washed away resulting in the possibility of leakage of gas.

12 REPAIR / SERVICING OF APPLIANCES

Consumer shall not attempt to service or repair LPG appliances. All repairs/servicing of the appliance shall be done by authorized mechanics of the LPG Distributor or authorized personnel of appliance manufacturer.

13 ACCIDENTS AND ENQUIRIES

Statutory regulations demand that notice of accident(s), involving LPG installation be given forth with:

- a) To the Chief Controller of Explosives for India by email followed by a letter giving particulars of the occurrence within 24 h; and
- b) To the Officer-in-Charge of the nearest Police Station by the quickest route.

This would normally be complied by the concerned LPG distributor of the oil company, after proper inquiry and investigation of the circumstances that lead to an accident.

14 MANDATORY INSPECTION

The mandatory inspection of the consumer’s installation is required to be carried out once every five years by authorized personnel. This is apart from the regular checks done by the delivery personnel at the time of refill delivery.

ANNEX A(*Foreword*)**COMMITTEE COMPOSITION**

Composition of Domestic and Commercial Gas Burning Appliances (Pressure Type)
Sectional Committee, MED 23

<i>Organization</i>	<i>Representative(s)</i>
L P G Equipment Research Centre, Bengaluru Agnisumukh, Bengaluru	SHRI ASHISH BERA (<i>Chairman</i>) SHRI HARI RAO
BSH Household Appliances Manufacturing Private Limited, Chennai	SHRI VIJAY KUMAR LOGANATHAN
Bharat Petroleum Corporation Limited, Mumbai	SHRI SUDIPTA SARKAR SHRI MOHIT RANE (<i>Alternate</i>)
Bureau of Energy Efficiency, New Delhi	Ms PRAVATANALINI SAMAL SHRI KAMRAN SHAIKH (<i>Alternate</i>)
Delton Industries, New Delhi	SHRI R. C. NANGIA SHRI VIVEK NANGIA (<i>Alternate</i>)
Directorate General of Quality Assurance (Stores), Kanpur	SHRI H. H. P. TIWARI
Gorani Industries Limited, Indore	SHRI ANIL GORANI
Goyal Engineers Private Limited, New Delhi	SHRI AJAY GOYAL SHRI NEERAJ GOYAL (<i>Alternate</i>)
Hindustan Petroleum Corporation Limited, Mumbai	SHRI DILIP KUMAR RAY SHRI SIVA SHANKAR (<i>Alternate</i>)
Kabsons Gas Equipment Pvt Ltd, Hyderabad	SHRI SATISH KABRA SHRI KUNAL KABRA (<i>Alternate</i>)
Indian Institute of Petroleum, Dehradun	SHRI PANKAJ KUMAR ARYA
Indian Institute of Technology Guwahati, Guwahati	SHRI MUTHU KUMAR
Indian Oil Corporation (Marketing), Mumbai	SHRI J. SHYAM SWAROOP
Indraprastha Gas Limited, New Delhi	SHRI BHUDEV SINGH SHRI K. C. DEWANGAN (<i>Alternate</i>)
L P G Equipment Research Centre, Bengaluru	SHRI P. R. DEODHAR SHRI RAHUL SHARMA (<i>Alternate</i>)
Petroleum Conservation Research Association, New Delhi	SHRI SURENDRA PRATAP
Ariston Thermo India Private Limited, Pune	SHRI ABHIJIT BANSHELKIKAR SHRI MAHESH BHANGALE (<i>Alternate</i>)
Rama Domestic Appliances, New Delhi	SHRI AMARJEET SINGH KOHLI SHRI MANMOHAN KRISHNAN (<i>Alternate</i>)
Shri Krishna Test House, New Delhi	SHRI SUNIL TALWAR
Sunflame Enterprises Private Limited, Faridabad	SHRI K. L. VERMA SHRI SANDEEP JUNEJA (<i>Alternate</i>)
Superflame Enterprises Private Limited, Faridabad	SHRI VIKRAM VERMA
Vanaz Engineers Limited, Pune	SHRI A. A. TAMBOLI SHRI V. N. PUJARI (<i>Alternate</i>)

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<i>Member Secretary</i>	
SHRI SANDEEP KESHAV SCIENTIST 'C' (MED), BIS	

Bureau of Indian Standards

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